

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

RENE MONSHOUWER ET AL

NL 000770

Serial No.

Filed: CONCURRENTLY

METHOD OF MEASURING ALIGNMENT OF A SUBSTRATE WITH RESPECT TO
A REFERENCE ALIGNMENT MARK

Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to calculation of the filing fee and examination,
please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 21, in the paragraph beginning on line 9,

With an off-axis alignment-measuring device, for example that of Fig. 8, not only the position of a substrate but also the position of the substrate holder or substrate table can be measured. To this end, the holder or table is also provided with an alignment mark similar to the global substrate alignment mark. If the position of the substrate holder with respect to the reference in the alignment-measuring device has been determined, the position of the substrate mark with respect to the substrate holder mark will be known. To be able to determine the mutual position of the mask pattern and the substrate, a further measurement is necessary, namely that of the position of the mask pattern with respect to the substrate holder or table. For this

measurement, the on-axis alignment device described with reference to Figures 1 and 3 may be used, with which the position of a mask mark with respect to substrate holder mark is then determined. Not only the double alignment-measuring device of Fig. 3, but also a single alignment-measuring device as described in US Patent 4,251,160 may be used.

IN THE CLAIMS

Please amend the claims as follows:

3. A method as claimed in claim 1, characterized in that use is made of gratings for the substrate alignment mark, the additional alignment mark and the reference alignment mark.
4. A method as claimed in claim 1, characterized in that the additional alignment mark is a latent mark.
6. A method as claimed in claim 1, characterized in that it is based on the on-axis alignment principle.
8. A method as claimed in claim 1, characterized in that it is based on the off-axis alignment principle.
9. A method of manufacturing devices in at least one layer of a substrate, which method comprises at least one set of the following successive steps:
- aligning a mask provided with a mask pattern comprising pattern features corresponding to a device feature to be configured in said layer;
 - imaging, by means of projection radiation, the mask pattern in a radiation-sensitive layer on the substrate, and

- removing material from, or adding material to, areas of said layer and substrate, which areas are delineated by the mask pattern image, characterized in that the alignment is carried out by means of the alignment-measuring method as claimed in claim 1.

REMARKS

The amendment to the specification was made to correct a typographical error. The foregoing amendments to claims 3, 4, 6, 8 and 9 were made solely to avoid filing the claims in the multiple dependent form so as to avoid the additional filing fee.

The claims were not amended in order to address issues of patentability and Applicant respectfully reserves all rights he may have under the Doctrine of Equivalents. Applicant furthermore reserves his right to reintroduce subject matter deleted herein at a later time during the prosecution of this application or continuing applications.

Respectfully submitted,

By 
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APPENDIX A

Page 21, in the paragraph beginning on line 9,

With an off-axis alignment-measuring device, for example that of Fig. 8, not only the position of a substrate but also the position of the substrate holder or substrate table can be measured. To this end, the holder or table is also provided with an alignment mark similar to the global substrate alignment mark. If the position of the substrate holder with respect to the reference in the alignment-measuring device has been determined, the position of the substrate mark with respect to the substrate holder mark will be known. To be able to determine the mutual position of the mask pattern and the substrate, a further measurement is necessary, namely that of the position of the mask pattern with respect to the substrate holder or table. For this measurement, the on-axis alignment device described with reference to Figures 1 and 3 may be used, with which the position of a mask mark with respect to substrate holder mark is then determined. Not only the double alignment-measuring device of Fig. 3, but also a single alignment-measuring device as described in US Patent 4,252,160 4,251,160 may be used.

APPENDIX B

3. A method as claimed in claim 1 or 2, characterized in that use is made of gratings for the substrate alignment mark, the additional alignment mark and the reference alignment mark.

4. A method as claimed in claim 1, 2, or 3, characterized in that the additional alignment mark is a latent mark.

6. A method as claimed in claim 1 ~~any one of claims 1 to 5~~, characterized in that it is based on the on-axis alignment principle.

8. A method as claimed in claim 1 ~~any one of claims 1 to 5~~, characterized in that it is based on the off-axis alignment principle.

9. A method of manufacturing devices in at least one layer of a substrate, which method comprises at least one set of the following successive steps:

- aligning a mask provided with a mask pattern comprising pattern features corresponding to a device feature to be configured in said layer;
- imaging, by means of projection radiation, the mask pattern in a radiation-sensitive layer on the substrate, and
- removing material from, or adding material to, areas of said layer and substrate, which areas are delineated by the mask pattern image, characterized in that the alignment is carried out by means of the alignment-measuring method as claimed in claim 1 ~~any one of claims 1 to 8~~.